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International Conference on Advanced Manufacturing

Research to Application through Standardization

Value Chain: Microstructure-Property Relationships and Mechanical Behavior

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The unique microstructural features and potential defects in metallic components fabricated by additive manufacturing (AM) result in key performance metrics and characteristics that may differ from their conventionally manufactured counterparts. These distinctive features include strongly textured microstructures, AM specific material flaws, surface irregularities, and more.

To understand the impact of these unique AM microstructural features on the material properties and consequently on parts performance, it is crucial to conduct thorough investigations through mechanical testing. While established testing standards exist for deriving various mechanical properties, it has become evident that conventional procedures may not always be applicable to AM materials due to the unique nature of the fabrication process.

This symposium aims to address the challenges posed by the unconventional thermophysical phenomena, mechanical characteristics and property dependencies observed under different conditions, such as various geometries, process parameters, and post-processing. The topics covered in this symposium will delve into these crucial aspects, providing insights into the complexities associated with the microstructural characteristics of AM materials and their implications on overall material properties and parts performance.

Topics of interest include but are not limited to:

- Applicability of existing test methods to additively manufactured materials and parts
- Advances in characterization strategies for AM microstructures and flaws
- Material testing methodologies representative of the part performance
- Structure-property-performance relationships
- Development of new test methods to accelerate and facilitate process qualification in AM
- Properties assessment of miniaturized engineering structures
- Influence of process and post-process parameters on microstructure, mechanical properties, and part performance
- Build size, orientation, and location dependence of mechanical properties
- Microstructural and flaws evolution and their relationship to location-specific performance
- Development and characterization of novel materials designed for AM